



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,152	02/11/2004	Arlie R. Conner	59373US002	3103
32692	7590	09/27/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			LE, KHANH H	
			ART UNIT	PAPER NUMBER
			2875	

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/776,152

Applicant(s)

CONNER, ARLIE R.

Examiner

Khanh H. Le

Art Unit

2875

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/13/04 & 6/02/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed May 13, 2004 was missing from the application file. Upon request, applicant faxed a copy of the information disclosure statement filed May 13, 2004 to the examiner.

Examiner considered the information disclosure statement filed on May 13, 2004.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the image-forming device having a plurality of mirrors in claim 30 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show a plurality of mirrors rotatable about a pivot axis as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended". If a drawing

Art Unit: 2875

figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-14, 16, 19-26, 29, 31, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Handschy (US Patent No. 6,038,005).

7. With respect to claim 1, Handschy discloses an illumination system having a plurality of light source modules (Fig. 4, item 52), an illumination target (item 46), and a system of optical elements (items 60, and 48) disposed between the plurality of light source modules and the illumination target. The system of optical elements images the

Art Unit: 2875

emitting surfaces of the light source modules onto the illumination target creating a plurality of images of the emitting surfaces (Fig. 4 and Col. 10, lines 36-45).

8. With respect to claim 2, Handschy discloses the images of the emitting surfaces are substantially superimposed to form an illumination patch, and the illumination patch substantially fills the illumination target (Fig. 4).

9. With respect to claim 3, Handschy discloses the illumination patch overfills the illumination target (Col. 3, lines 21-30).

10. With respect to claim 4, Handschy discloses the shape of at least one of the emitting surface substantially matches the shape of the illumination target (Col. 10, lines 1-21)

11. With respect to claim 5, Handschy discloses the shape of the illumination target is substantially square (Col. 10, lines 1-18).

12. With respect to claim 6, Handschy discloses the illumination target (item 46) is an entrance of a light tunnel (item 48).

13. With respect to claims 7 and 9, Handschy teaches the shape of at least one of the light emitting surfaces is substantially square (Fig. 7A, item 68), the shape of the illumination target being substantially square, and the system of optical elements is configured so that the shape of the illumination patch substantially matches the shape of the illumination target (Col. 10, lines 1-21).

14. With respect to claim 8, Handschy disclose the illumination target (LCD, spatial light modulator, item 46) is an image forming devices.

Art Unit: 2875

15. With respect to claim 10, Handschy discloses the pluralities of light source modules are disposed in an array within a non-radially symmetrical aperture (Fig. 7A and 7B).

16. With respect to claim 11, Handschy discloses the images of the emitting surfaces are closely packed (Fig. 18A-C and Col. 18, lines 35-38) thus forming an illumination patch that substantially fills the illuminating target.

17. With respect to claim 12, Handschy discloses that the images of the emitting surfaces overlap thus forming an illumination patch that substantially fills the illumination target (Col. 2, lines 51-63).

18. With respect to claim 13, Handschy discloses that the illumination target is an active matrix liquid crystal image generator, which is a LCD having a plurality of pixels configured in a matrix to generate images.

19. With respect to claim 14, Handschy discloses the light source modules (Fig. 4, item 52) and the system of optical elements (item 60) are configured to form a plurality of light channels aimed substantially into the illumination target (Col. 10, lines 45-51).

20. With respect to claim 16, Handschy discloses the light source modules (Fig. 3, item 52) are disposed substantially coplanar with each other and the system of optical elements (items 34 and 48) comprises means for aiming at least some of the light from each light source module substantially toward the illumination target.

21. With respect to claim 19, Handschy discloses an illumination system having a plurality of light source modules (Fig. 4, item 52), each light source module having a plurality of emitting surfaces of different colors disposed next to each other (Col. 10,

Art Unit: 2875

lines 45-53), an illumination target (item 46), and a system of optical elements (items 60 and 48) disposed between the plurality of light source modules and the illumination target. The system of optical elements images the plurality of emitting surfaces of the light source modules onto the illumination target creating a plurality of images of the emitting surfaces (Fig. 4 and Col. 10, lines 36-45).

22. With respect to claim 20, Handschy discloses that each light source module comprises a first light emitting surface of a first color (Fig. 18B, item 164), a second light emitting surface of a second color (item 166) and a third light emitting surface a third color (item 168).

23. With respect to claim 21, Handschy discloses the images of the emitting surfaces (Fig. 18A, item 152) are substantially superimposed to form an illumination patch that is substantially fills the illumination target (item 46).

24. With respect to claim 22, Handschy discloses the illumination patch overfills the illumination target (Col. 19, lines 3-10).

25. With respect to claim 23, Handschy discloses the system of optical elements having dichroic mirrors (polarizing beam splitting cube, item 48, Col. 7, line 6).

26. With respect to claim 24, Handschy discloses the illumination target having the first, second, and third color zones, and the system of optical elements images the first emitting surface onto the first color zone, the second emitting surface onto the second color zone, and the third emitting surface onto the third color zone (Fig. 15B).

Art Unit: 2875

27. With respect to claim 25, Handschy discloses the system of optical elements having lenticular array (Fig.4, item 60 and Col. 10, lines 35-36) disposed between the plurality of light source modules (item 52) and the illumination target (item 46).

28. With respect to claim 26, Handschy discloses the first, second and third colors are primary colors (Col. 19, line 62-63).

29. With respect to claim 29, Handschy discloses an illumination system having a plurality of light source modules (Fig. 4, items 52), disposed in an array within a non-radially symmetrical aperture (Fig. 7A and 7B), an illumination target (item 46), and a system of optical elements (items 60 and 48) disposed between the plurality of light source modules and the illumination target.

30. With respect to claim 31, Handschy discloses an optic arrangements including light source arrangements for an active matrix liquid crystal image generator having a plurality of light source modules (Fig. 4, item 52) an illumination target (item 46), and a system of optical elements (items 60, and 48) disposed between the plurality of light source modules and the illumination target. The light source modules (item 52) and the system of optical elements (items 60 and 48) are configured to form a plurality of channels aimed substantially into the illumination target (item 46).

**31.** With respect to claim 33, Handschy discloses the light source modules (Fig. 3, item 52) are disposed substantially coplanar with each other and the system of optical elements (items 34 and 48) comprises means for aiming at least some of the light from each light source module substantially toward the illumination target.



***Claim Rejections - 35 USC § 103***

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

33. Claims 15 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Handschy (US Patent No. 6,038,005) in view of Anderson (US Patent No. 5,997,150).

34. With respect to claims 15 and 32, Handschy teaches the light source modules disposed on a flat glass substrate (Fig. 7A, item 68) but does not teach the light source modules disposed tangentially to and along a spherical surface.

Anderson shows LED's are mounted tangentially to and along a spherical surface in figure 6 and figure 7, in order to reduce chromatic beam distortion from LEDs at the edges of the array. The light from each LED intersects and focuses at a common focal point F (Col. 6, lines 12-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the LEDs such that the light from each LED intersects and focuses at a common focal point as Anderson's illumination system in the illumination system of Handschy so that chromatic beam distortion from LEDs at the edges of the array can be reduced from Handschy's illumination system.

Art Unit: 2875

35. Claims 17, 18, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Handschy (US Patent No. 6,038,005) in view of Horigome (US Patent No. 6,280,058 B1).

36. With respect to claims 17, 18, 27 and 28, Handschy teaches the system of optical elements in the illumination system having a collimating lenslet (Fig. 7B, item 84) associated with each of the light source modules to direct the light beam toward the illumination target but does not teach a pair of meniscus lenses associated with each light source module.

Horigome teaches a method of achieving a bright and uniform illumination from a light source by increasing the numerical aperture of the collector lens on the light source side (Col. 1 lines 58-60). The collector lens on the light source side is a pair of meniscus lenses (Fig. 3 and 7). Each meniscus lens has a convex side and a concave side. The pair of lenses is configured so that the concave side of each of the meniscus lenses is facing the light source.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a pair of meniscus lenses as taught by Horigome in the illumination system of Handschy so that the light in the illumination system of Handschy can be brighter and more uniform.

37. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Handschy (US Patent No. 6,038,005) in view of McClelland et al. (US Patent No. 6,201,629 B1).

Art Unit: 2875

38. With respect to claim 30, Handschy teaches an illumination system having a spatial light modulator as the image-forming device but does not teach the spatial light modulator having a plurality of mirrors rotatable about a pivot axis.

McClelland teaches a torsional micro-mechanical mirror system, a type of spatial light modulator, that is useful for video display systems since it is compact in size and can produce high resolution images at rapid frame rates, having a mirror (Fig. 1, item 3) that is rotatable about a pivot axis (Fig. 2A, item 7). The aperture of the mirror has a long dimension and a short dimension (Fig.3) and is oriented so that the long dimension is aligned with the pivot axis of the mirrors of the image-forming device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the active matrix liquid crystal image generator of Handschy with the torsional micro-mechanical mirror system of McClelland so that the size of the image generator of Handschy can be reduced, and produce high resolution images at rapid frame rates.

### ***Conclusion***

39. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nakano discloses projection systems having different color LEDs arrays, optical systems having a collimating lenslet, meniscus lenses, LCD image generators, and dichroic mirrors. Tullis's drawing shows the LEDs light beams are overlapping each other and another drawing shows the LEDs are disposed tangentially

Art Unit: 2875

and along a spherical surface. Chan and Stahl disclose methods of correcting image problems by pixel compensation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh H. Le whose telephone number is (571) 272-8325. The examiner can normally be reached on Monday - Friday, 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Khanh H. Le  
Examiner  
Art Unit 2875

KHL

  
RENEE LUEBKE  
PRIMARY EXAMINER